

RECEIVED  
CENTRAL FAX CENTER

MAR 03 2009

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Atty Docket No.: A01463

In re application of: Brian Michael Bridgewater *et al.* Confirmation No. 3734

Serial No.: 10/700,078 Group Art Unit: 1796

Filed: November 3, 2003 Examiner: Vickcy Ronesi

For: Aqueous Coating Composition Comprising Emulsion Polymer Formed In The Presence of Thermal Initiator And Neutralizer

DECLARATION OF RALPH CRAIG EVEN UNDER 37 C.F.R. §1.132

I, Ralph Craig Even, declare that the following is true and accurate and that I make this declaration of my own free will, as follows:

The Declarant

1. My name is Ralph Craig Even, and I currently reside at 1424 Mauck Road, Blue Bell, PA 19422. I received my B.A. in Chemistry from Franklin and Marshall College in 1981. I am a named inventor on the above-mentioned patent application.
2. I have been employed by Rohm and Haas Company since 1981, for the most part as a Senior Chemist in Emulsion Polymer Synthesis. My primary job responsibility over that 26-year period was the experimental design and synthesis of new emulsion polymers and their evaluation, specifically in their use in the Coatings industry. During that time, I have performed many syntheses and evaluations of emulsion polymers and had others perform such work under my direction, including the synthesis and evaluation of the emulsion polymers of this Patent Application and those presented in this Declaration.

The December 3, 2008 Office Action

3. I have reviewed the Office Actions in the above-mentioned patent application and understand that the instant claims 1-7 and 15-18 stand rejected as obvious primarily

over Friel (US 5,731,377). The rejection has suggested that Applicants have not shown criticality for the entire scope of the presently claimed process on the final product, and previous data submitted by Applicants has been found to not be reasonably commensurate in scope with the claimed invention.

#### Polymers Prepared

4. Under my direction, the following ten (10) emulsion polymers, shown in Table 1, below, were prepared by a thermal polymerization process run at 88 C. Polymers 1-6 show process variations for a single monomer composition as follows: 57 BA / 40 MMA / 2 MAA / 1 Ureido monomer. Polymers 7-10 vary the monomer composition, and initiators (APS is ammonium persulfate; SPS is sodium persulfate) and neutralizers ( $\text{Na}_2\text{CO}_3$  is sodium carbonate and NaOH is sodium hydroxide). The polymers were prepared in pairs: one polymer prepared *via* the inventive process, the other using a comparative process. The process details are shown in Table 1 and discussed in paragraph 5, below:

Table 1

	Sample	Polymer	Total Initiator	Initiator		Neutralizer		Feed Time
				Kettle	CoFeed	Kettle	CoFeed	
1.	AH301 (Comp)	57BA/40MMA/2MAA (Friel)	0.25%	0.15%	0.10%	8.0%	0	1.5 hr
2.	AH303 (Inv)	57BA/40MMA/2MAA	0.25%	0.05%	0.20%	0.4%	7.6%	1.5 hr
3.	AH331 (Comp)	57BA/40MMA/2MAA	0.30%	0.18%	0.12%	56.0%	0	3.5 hr
4.	AH307 (Inv)	57BA/40MMA/2MAA	0.30%	0.07%	0.23%	2.4%	53.6%	3.5 hr
5.	AH309 (Comp)	57BA/40MMA/2MAA	0.05%	0.03%	0.02%	56.0%	0	3.5 hr
6.	AH311 (Inv)	57BA/40MMA/2MAA	0.05%	0.01%	0.04%	0	56.0%	3.5 hr
7.	SB170 (Comp)	13BA/30EA/54MMA/2AA	0.30%	0.18%	0.12%	20.0%	0	1.5 hr
8.	SB171 (Inv)	13BA/30EA/54MMA/2AA	0.30%	0.03%	0.27%	8.0%	12.0%	1.5 hr
9.	SB168 (Comp)	40BA/46MMA/10STY/3MAA	0.30%	0.30%	0.30%	56.0%	14.0%	1.5 hr
10.	SB169 (Inv)	40BA/46MMA/10STY/3MAA	0.30%	0.11%	0.19%	7.0%	63.0%	1.5 hr

1. 1% ureido monomer in all polymers.

5. Emulsion AH0301 was made by the process of Friel, in Example 3 of US 5,731,377. Emulsion AH0303 has the same monomers and quantities of initiator and neutralizer; however, the polymerization is run by the instantly recited process of claim 2. In particular, the Friel process employs the majority of the initiator and neutralizer at the start of the polymerization (and thus the majority is present during the first 10% by weight of the conversion of monomers to emulsion polymer), which can be referred to as Kettle biased, whereas the inventive process employs the majority of the initiator and neutralizer in the co-feed, which can be referred to as co-feed biased. For the other pairings, the comparative Friel process uses the kettle biased addition of initiator and neutralizer, whereas the inventive process uses the co-feed biased addition of initiator and neutralizer (see amounts in the kettle and co-feed in Table 1; see also Table 2).

6. Sample AH-0301 (Comparative) is a reproduction of Friel's Example 3, cited as art, with total initiator level of 0.25%, based on dry polymer weight, and 8% neutralizer, based on acid monomer. Sample AH-0303 (Inventive) has the same monomer composition and the same initiator and buffer levels as Friel, but is run by the inventive process instead of the prior art process. Other polymerizations were run in order to compare polymers made using the process of Friel and the inventive polymers using the instantly claimed inventive process. Thus, comparisons were made at total initiator levels of 0.3%, based on dry polymer weight, and using 56% neutralizer, based on acid monomer (AH-0331, Comparative, and AH-0307, Inventive) and also at total initiator levels of 0.05%, based on dry polymer weight, and using 56% neutralizer, based on acid monomer (AH-0309, Comparative, and AH-311, Inventive). The comparisons directly address the Friel art at both the top and bottom of the instantly recited initiator range level. See, for example, claim 2: "...wherein said initiator is used in the amount of 0.05 to 0.3%, by weight, based on dry polymer weight..." Similarly, the neutralizer levels are addressed across the instantly recited neutralizer range level. For example, Polymers 1 and 2 use 8% neutralizer, and polymers 9 and 10 use 70% neutralizer (expressed as equivalents based on acid monomer); see claim 2: "...wherein said neutralizer is used in the amount of from 5% to 75%, on an equivalents basis, based on said monoethylenically unsaturated acid monomer..."

7. Polymers 1-6 were studied by GPC-MALS (Gel Permeation Chromatography with Multi Angle Light Scattering). Detection was by a MALS-Wyatt HELEOS

refractive index detector (from Wyatt OptiLab rEX). Gel permeation chromatography separation techniques yield longer elution times for smaller molecules. Conventional emulsion polymerizations, such as that of Friel, result in very high molecular weight polymers, which tend to pass through the column in one elution time. The GPC-MALS traces for the six (6) emulsion polymers in Table 1 are attached, as Appendix A. The GPC-MALS traces show that the products of the inventive process are different to those produced in Friel. For each pairing, the inventive process has a much more pronounced elution due to low molecular weight polymers.

8. As shown in the GPC-MALS data, the inventive process yields an effective amount of a lower molecular weight component in addition to a very high molecular weight material. For each pair, the polymer resulting from the inventive process has a much greater amount of the low molecular weight polymer component (higher elution time component, at elution times of approximately 46-49 minutes) compared to the comparative prior art process of Friel. This gives improved diffusion between latex polymer particles and a more fully coalesced system (thereby minimizing the use of coalescents or added volatile organic compounds, VOC), which results in a more homogeneous film for the polymer formed by the inventive process, relative to that formed by the prior art process, when film formation of this hard (high Tg) polymer composition occurs at ambient temperature. This equates to improved scrub resistance and dirt pickup resistance, both of which are important properties for decorative and functional coatings.

9. The foregoing data directly compares the instantly recited invention of claim 2 to the cited closest art of Friel and demonstrates that the instantly recited product-by-process of claim 2 makes a composition that differs from the product made by Friel.

10. Paints were prepared for all of these polymers using the formulation as shown in Appendix B. For each binder pair, the paint formulation is the same for each binder (additions of aqueous binder are adjusted for % solids of the emulsion). The formulations for binders 3-6 are the same as those shown for binders 1 and 2 (they have the same monomer composition).

11. Scrub resistance data is shown in Table 2, below.

Table 2

	Sample	Emulsion Polymer <sup>1</sup>	Fox Tg (C)	Total Initiator (wt% based on polymer)	Initiator, first 10% (wt% based on total initiator)	Neutralizer (equivs based on acid monomer)	Neutralizer, first 25% (wt% based on total neutralizer)	Scrub Resistance of Paint
1.	AH301 (Comp)	57BA/40MMA/2MAA	5	0.25 APS	60	8 Na <sub>2</sub> CO <sub>3</sub>	100	778
2.	AH303 (Inv)	57BA/40MMA/2MAA	5	0.25 APS	20	8 Na <sub>2</sub> CO <sub>3</sub>	5	842
3.	AH331 (Comp)	57BA/40MMA/2MAA	5	0.30 APS	60	56 Na <sub>2</sub> CO <sub>3</sub>	100	512
4.	AH307 (Inv)	57BA/40MMA/2MAA	5	0.30 APS	23	56 Na <sub>2</sub> CO <sub>3</sub>	4	744
5.	AH309 (Comp)	57BA/40MMA/2MAA	5	0.05 APS	60	56 Na <sub>2</sub> CO <sub>3</sub>	100	538
6.	AH311 (Inv)	57BA/40MMA/2MAA	5	0.05 APS	20	56 Na <sub>2</sub> CO <sub>3</sub>	0	955
7.	SB170 (Comp)	13BA/30EA/54MMA/2AA	30	0.30 APS	60	20 Na <sub>2</sub> CO <sub>3</sub>	100	773
8.	SB171 (Inv)	13BA/30EA/54MMA/2AA	30	0.30 APS	10	20 Na <sub>2</sub> CO <sub>3</sub>	40	704
9.	SB168 (Comp)	40BA/46MMA/10STY/3MAA	20	0.30 SPS	100	70 NaOH	80	326
10.	SB169 (Inv)	40BA/46MMA/10STY/3MAA	20	0.30 SPS	35	70 NaOH	10	558
11.	Comp. C (Comp)	48BA/50MMA/2MAA	8	0.14 APS	22.2	34 Na <sub>2</sub> CO <sub>3</sub>	100	900
12.	Comp. D (Comp)	48BA/50MMA/2MAA	8	0.14 APS	77.8	34 Na <sub>2</sub> CO <sub>3</sub>	100	831
13.	Ex. 2 (Inv)	48BA/50MMA/2MAA	8	0.14 APS	22.2	34 Na <sub>2</sub> CO <sub>3</sub>	5	1417

1. 1% ureido monomer in all polymers except polymers 11-14.

Taken as a whole, and including data presented in the originally filed application, the data demonstrate that significant advantages in polymer properties may be obtained using the inventive process. Applicants have shown that the product obtained by the product-by-process of the instantly recited claims is different from that obtained by the product-by-process of the cited art. As one skilled in the art, I do not find any teaching or suggestion of the claimed inventive process within Friel. The instantly recited claims are not obvious in light of Friel, even in combination with other cited references.

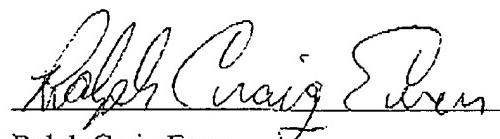
12. As one skilled in the art, I find that the original data, along with the data contained herein, demonstrates in a manner reasonably commensurate in scope with the claimed invention that the instantly recited invention makes a different product from that

of Friel, which inventive product may unexpectedly possess significantly higher scrub resistance, and which product is not obvious in light of Friel. That is, the data presented is sufficient for one skilled in the art to establish a reasonable correlation between the showing and the entire scope of the claim.

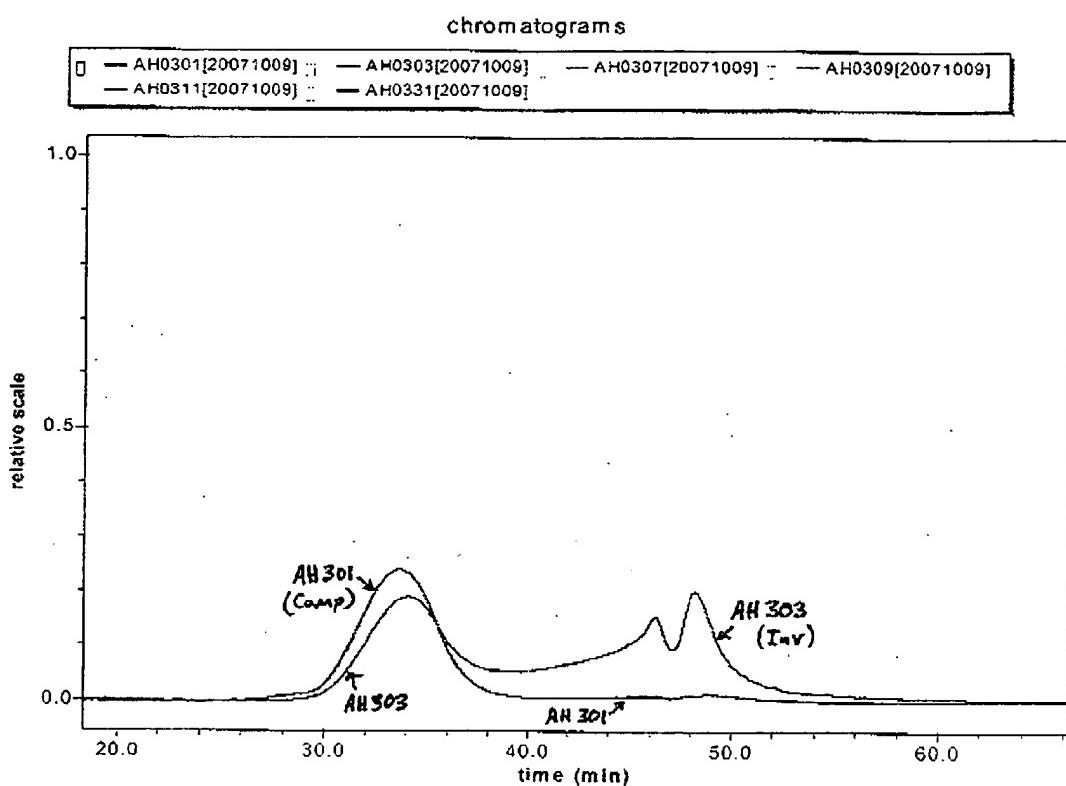
Statement Under 28 U.S.C. §1746

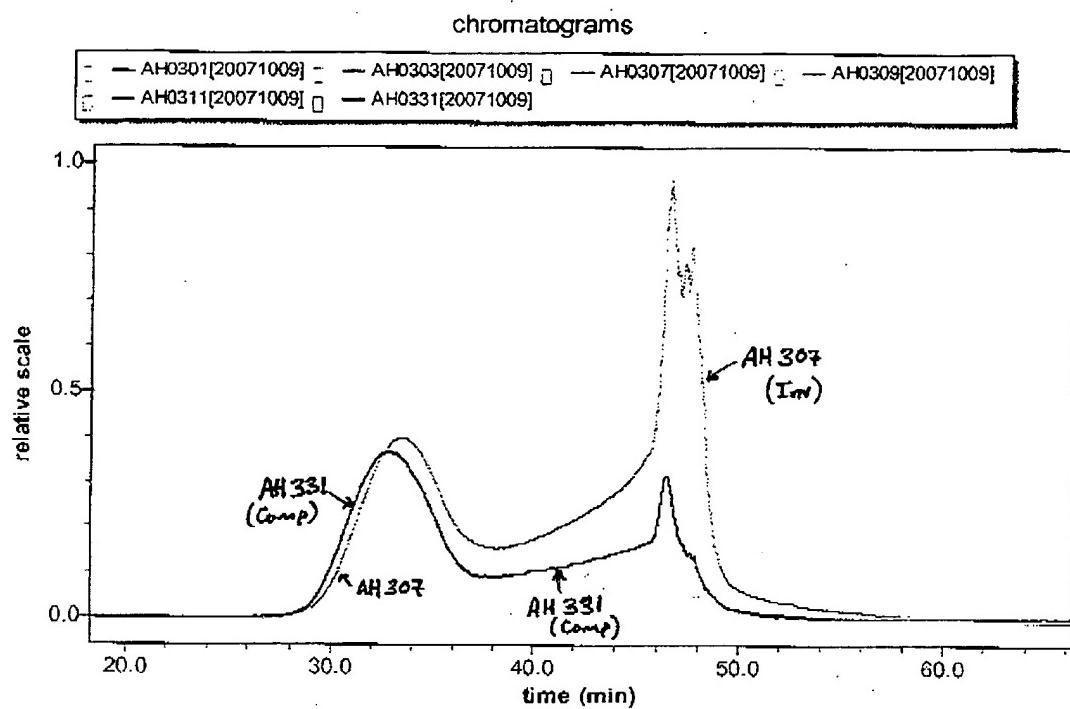
13. I declare that all statements made in this declaration of my own knowledge are true. I believe that all statements made herein on information and belief also are true. Furthermore, I understand that willful false statements and the like so made are punishable by fine or imprisonment, or both, under the United States Code, and such willful false statements may jeopardize the validity of any patent application or patent that may issue on this patent application.

Dated: 3/3/2009

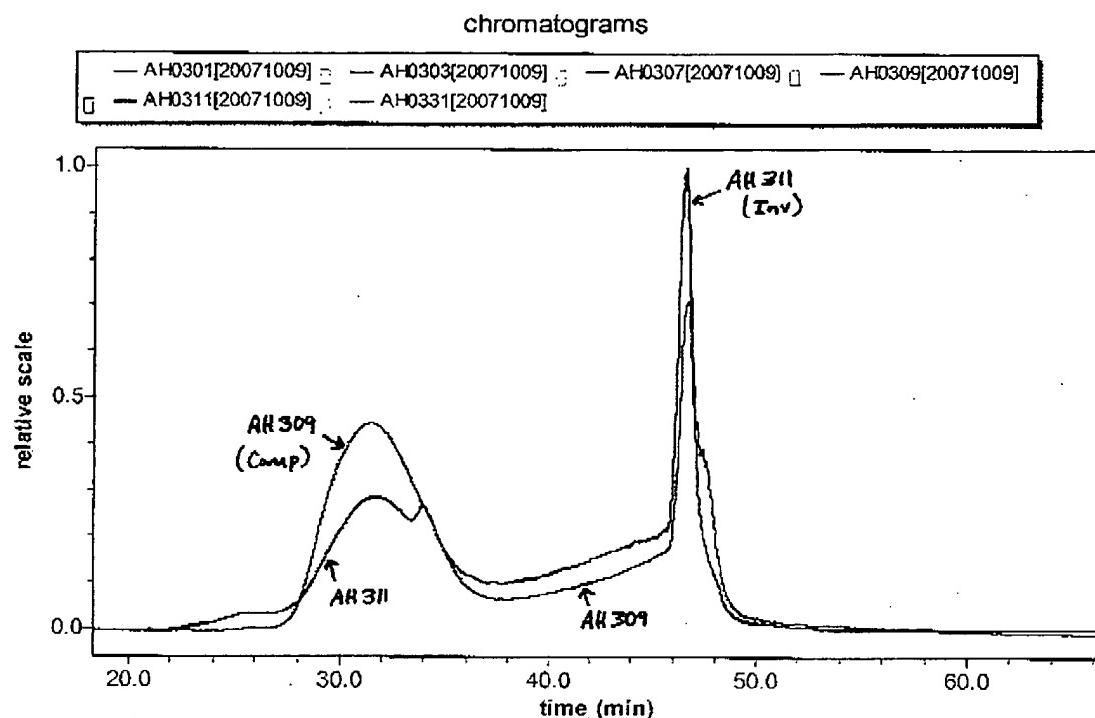
  
Ralph Craig Even

## APPENDIX A: GPC-MALS Data





6



## APPENDIX B – Paint Formulations.

Materials	Grams					
	Paint 1	Paint 2	Paint 3	Paint 4	Paint 5	Paint 6
<b>Grind</b>						
Propylene Glycol	36.40	36.40	36.40	36.40	36.40	36.40
Tamol 731A	12.90	12.90	12.90	12.90	12.90	12.90
Foamaster VL	1.00	1.00	1.00	1.00	1.00	1.00
Ti-Pure R-900	253.00	253.00	253.00	253.00	253.00	253.00
Water	62.00	62.00	62.00	62.00	62.00	62.00
<b>Letdown</b>						
Binder 7 (SB170)	524.32					
Binder 8 (SB171)		525.51				
Binder 9 (SB168)			529.10			
Binder 10 (SB169)				523.14		
Binder 1 (AH301)					521.06	
Binder 2 (AH303)						518.47
Ropaque Ultra	28.83	28.83	28.83	28.83	28.83	28.83
Water	50.00	50.00	50.00	50.00	50.00	50.00
Texanol	24.09	24.09	12.05	12.05	0.00	0.00
Foamaster VL	1.00	1.00	1.00	1.00	1.00	1.00
Acrysol RM-1020	24.11	24.11	10.54	10.54	27.67	27.67
Acrysol RM-825	3.71	3.71	1.26	1.26	0.00	0.00
Water	34.99	33.87	59.18	64.81	62.73	66.03